4.0 AFFECTED ENVIRONMENT AND THE ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

4.1 Approach

Section 4.0 of the Environmental Assessment describes the environment which would be potentially affected by the proposed project, and discusses the potential impacts which may result. Beginning with Section 4.3, this section of the Environmental Assessment is organized by resource. Relevant aspects of the existing conditions for each resource are described followed by potential consequences of the proposed action on that resource. Emphasis is placed on the resources and consequences identified as potentially more significant during DOE's public scoping process. For resources not expected to be impacted by the proposed action or where consequences resulting from the proposed action would be expected to be *de minimis,* descriptions and discussions are less detailed.

4.2 Site Description

The proposed project would be located at the site of the Parrish Shaft of Eastern Associated Coal Corporation's (EACC) Federal Number 2 Mine in the Battelle District of western Monongalia County, West Virginia. The site was previously the location of the Miracle Run exhaust Fan for the Federal Number 2 mine. The site is currently used by EACC for an emergency hoistway. The access road to the site is off of County Route 13 approximately 0.4 miles from County Route 15. The proposed site is located approximately 2.25 miles southeast of Wadestown, WV in an unincorporated section of Monongalia County, and is situated in the south central section of the Wadestown, WV - PA USGS 7.5 minute topographic quadrangle.

The site for the proposed generator facility is located in the Dunkard Creek watershed approximately 400 feet north of Right Branch Miracle Run. Right Branch Miracle Run flows predominantly north-northeast for over eight miles until it joins Miracle Run about five miles downstream from the project site. Miracle Run is one of six major tributaries of Dunkard Creek in western Monongalia County, WV. The Dunkard Creek watershed is a part of the larger Lower Monongahela River watershed.

Gathering lines to collect waste methane from coal mine vents would run from property located off of County Route 15 approximately 1 mile southeast of and across a small unnamed ridge from the main project site. The route for the buried lines would cross a small, unnamed tributary of Right Branch Miracle Run and would proceed across a small sloping field and along a jeep trail to the top of the unnamed ridge. It would generally follow an existing power line along the ridge and down the western

slope, where it would cross underneath County Route 13 and over the Right Branch Miracle Run next to the Parrish Shaft site.

4.3 Air Quality

The air quality section provides a general discussion of the air quality in the region and identifies and discusses potential impacts to air quality anticipated from the proposed project. The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for the following seven criteria pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter of less than 10 micron size (PM_{10}), particulate matter of less than 2.5 micron size ($PM_{2.5}$), and lead (Pb). The NAAQS are expressed as concentrations of the pollutant in ambient air. Table 4.1 lists the current standards established by EPA for the seven criteria pollutants. It should be noted that the NAAQS for particulate matter are derived from statistical data collected over a three year period. The $PM_{2.5}$ standard was promulgated in 1997. Implementation of this new standard was blocked by a civil suit filed by an industrial consortium. The matter is still before the courts. Consequently, NAAQS for $PM_{2.5}$ has not been implemented and is not enforceable at this time.

For each of the NAAQS for criteria pollutants, the EPA classifies regions within the states as either being in attainment or not being in attainment for each of the criteria pollutants mentioned above. Some regions for which insufficient data are available for accurate classification are listed as nonclassified. In response to the NAAQSs and the subsequent classification, each state is required to submit to the EPA for approval an implementation plan detailing the manner by which the state will achieve and maintain the NAAQS within the state. The State Implementation Plan (SIP) submitted by West Virginia was initially approved by EPA in 1972 and has been subsequently revised as the air quality in areas initially not in attainment with one or more of the NAAQS has improved.

As a potential Federal co-sponsor of the proposed project, DOE would be required to prepare a conformity determination if the proposed project was located in a nonattainment area for any criteria pollutant. A conformity determination would also be required if the proposed project would be located in a maintenance area - an area in attainment but which was previously in nonattainment for any criteria pollutant and is striving to maintain attainment with one or more criteria pollutants pursuant to an approved SIP. The conformity determination assures that an agency of the Federal

POLLUTANT	STANDARD VALUE *		STANDARD TYPE
	Carbon Monoxide (CO)		
8-hour Average	9 ppm	(10 mg/m^3)	Primary
1-hour Average	35 ppm	(40 mg/m^3)	Primary
	Nitrogen Dioxide (NO_2)		
Annual Arithmetic Mean	0.053 ppm	(100 µg/m^3)	Primary & Secondary
Ozone (O_3)			
1-hour Average	0.12 ppm	(235 µg/m^3)	Primary & Secondary
8-hour Average **	0.08 ppm	(157 µg/m^3)	Primary & Secondary
	Lead (Pb)		
Quarterly Average	1.5 µg/m^3		Primary & Secondary
	Particulate (PM 10)[1]		
Annual Arithmetic Mean	50 µg/m^3		Primary & Secondary
24-hour Average	150 µg/m^3		Primary & Secondary
	Particulate (PM 2.5)[2]		
Annual Arithmetic Mean **	15 µg/m^3		Primary & Secondary
24-hour Average **	65 µg/m^3		Primary & Secondary
	Sulfur Dioxide (SO_2)		
Annual Arithmetic Mean	0.03 ppm	(80 µg/m^3)	Primary
24-hour Average	0.14 ppm	(365 µg/m^3)	Primary
3-hour Average	0.50 ppm	(1300 µg/m^3)	Secondary

Note: Values in parentheses are approximate equivalent concentrations

[1] Particles with diameters of 10 micrometers or less

[2] Particles with diameters of 2.5 micrometers or less.

** The ozone 8-hour standard and the PM 2.5 standards are included for information only. A 1999 federal court ruling blocked implementation of these standards, which EPA proposed in 1997. EPA has asked the U.S. Supreme Court to reconsider that decision.

Table 4.1 National Ambient Air Quality Standards (NAAQS)

government does not undertake actions that would violate provisions of a State's approved implementation plan.

EPA has also established standards to comply with the Prevention of Significant Deterioration (PSD) of air quality as defined by the NAAQSs. The PSD standards provide a ceiling on allowable increases in concentration of pollutants in areas which are in attainment with all NAAQSs. PSD standards are applicable for major new emission sources as well as existing sources undergoing major modifications which would increase emissions of a regulated pollutant. PSD standards are expressed as allowable increments (increases) in the atmospheric concentration of regulated pollutants. One set of allowable increment exists for most of the United States. Certain areas within the United States are designated as Class I areas. These areas are defined under the Clean Air Act (42 USC 7472 Section 162) as international parks, national parks that exceed 6,000 acres or national memorial parks that exceed 5,000 acres in size. Allowable PSD increments currently exist for SO_2, NO_2, and PM_{10}, and are shown in Table 4.2.

Because the allowable PSD increments are expressed as increases in atmospheric concentrations of regulated pollutants (for example, milligrams per cubic meter) and not as emission rates (for example, tons per year), determining whether a proposed project would result in an exceedance of an allowable increment requires atmospheric modeling. To reduce the burden on industry while ensuring compliance with PSD increments, EPA allows states to designate smaller emission sources as "synthetic minor sources" under PSD regulations. Sources choosing to be regulated as synthetic minor sources agree to limit by permit their emissions of pollutants covered under PSD regulations to below the thresholds which trigger a New Source Review and applicability of PSD regulations.

		Allowable Increment ($\mu g/m^3$)	
Pollutant	**Averaging Time**	**Class I Area [1]**	**Class II Area [2]**
SO_2	3 hr (max)	25	512
	24 hr (max)	5	91
	Annual[3]	2	20
NO_2	Annual[3]	2.5	25
PM_{10}	24 hr (max)	8	30
	Annual[3]	4	17

[1] Special designated areas - including international parks, national parks over 6,000 acres, national wilderness areas over 5,000 acres.
[2] Remainder of the United States
[3] Arithmetic mean

Table 4.2 Allowable PSD Increments

In addition to the NAAQS, EPA regulates air quality by limiting toxic and other emissions from certain industrial segments. Under the Clean Air Act Amendments of 1990, EPA is required to regulate sources of 188 listed toxic air pollutants. (Note that this list originally referenced 189 pollutants, but EPA has subsequently removed the chemical caprolactum from the list.) On July 16, 1992, EPA published a list of industry groups (known as source categories) that emit one or more of these hazardous air pollutants. For listed categories of "major" sources (those that have the potential to emit 10 tons/year or more of a listed hazardous air pollutant (HAP) or 25 tons/year or more of a combination of HAPs), the Clean Air Act requires EPA to develop standards that are based on stringent air pollution controls, known as maximum achievable control technology (MACT). Oil and natural gas production and natural gas transmission and storage are source categories listed by EPA for regulation.

On June 17, 1999, EPA promulgated National Emission Standards for Hazardous Air Pollutants (NESHAP) for the oil and natural gas production industry. These NESHAP define the MACT for control of emissions from this industry. Consequently, this rule is sometimes referred to as the ONG (Oil and Natural Gas) MACT. In general terms, the rule requires controls on certain glycol dehydration units and condensate storage tanks, as well as equipment leaks at natural gas processing plants. The rules are applicable to major sources of hazardous air pollutants in the Oil and Natural Gas production industry. The rule allows three years for facilities to come into compliance, but requires that some facilities provide notification of their compliance plans within one year from rule promulgation (or by June 17, 2000).

4.3.1 Affected Environment

Monongalia County is classified as being in attainment for all NAAQS. Air quality within the state is regulated through the West Virginia Department of Environmental Protection (WVDEP) - Division of Air Quality (DAQ). For purposes of determining permit requirements under applicable state air regulations, the DAQ defines a major source as one having a potential to emit more than 100 tons per year of any regulated criteria pollutant. The proposed project has the potential to emit more than 100 tons per year of oxides of nitrogen, and would be regulated as a new source under state air quality regulations (45CSR13). The industrial participant has applied for and received a permit to construct the electrical generation facility being considered in the proposed action (permit number R13-2148).

No parts of Monongalia County are designated as a Class I area for purposes of determining the application of allowable PSD increments. Class II allowable PSD increments for SO_2, NO_2, and PM_{10} would be applicable to the proposed project if the project met the thresholds as a "major source" under PSD regulations. The WVDEP-

DAQ has designated the proposed project as a "synthetic minor source" for purposes of PSD regulation, and PSD increments would not apply.

The ONG MACT was targeted to cover the largest sources of HAPs within the industry. Facility which process less than 650 MCFD of gas are exempt from the implementing the MACT requirements. The proposed project would process 1,150 MCFD of gas, and so would not be exempted from MACT requirements as a facility. The ONG MACT also exempts certain individual units within a facility based on the size of the particular unit. Glycol dehydration units with annual average throughput of less than 3 MMCFD are exempt from MACT regulations. The glycol dehydration unit which would be installed at the proposed project is expected to have an average annual throughput of < 1.15 MMCFD, and would be exempt from the ONG MACT requirements.

4.3.2 Environmental Consequences

The proposed project will combust coal mine waste methane. Methane is the major component of natural gas. The combustion of natural gas produces varying quantities of all criteria pollutants regulated under NAAQSs. The proposed project would emit small quantities of NO_x, CO, SO_2, VOCs and particulate matter. Emission of criteria pollutants allowed by permit are shown in table 4.3. These pollutants would be emitted from the top of the 90 foot stack and would be dispersed into the atmosphere. Consistent with its regulation as a synthetic minor source, the proposed project would not be expected to significantly add to the ambient concentration of regulated criteria pollutants.

Criteria Pollutant	Permitted Emissions (tons/yr)
NO_x	249.1
CO	17.84
SO_2	12.24
PM_{10}	0.8
VOC	6.47

Table 4.3 Permitted Emissions of Criteria Pollutants for the Proposed Project

The combustion of methane also produces trace amounts of some materials regulated as hazardous air pollutants (HAPs). In particular, very small quantities of acetaldehyde, acrolein, benzene, formaldehyde, naphthalene, toluene, and xylene could be emitted from the proposed project. The quantities of these HAPs which could be emitted under the air permit granted by the DAQ are shown in

table 4.4. Total HAPs expected to be emitted by the proposed project are below thresholds which would trigger applicability of NESHAP rules. Further, the small glycol dehydrator which could be used to dry the waste methane sold to Equitrans would not be subject to MACT rules promulgated for the Oil and Natural Gas industry.

VOC Hazardous Air Pollutant	Permitted Emissions (tons/yr)
Acetaldehyde	0.338
Acrolein	0.094
Benzene	0.265
Formaldehyde	2.59
Naphthalene	0.008
Toluene	0.092
Xylene	0.026

Table 4.4 Permitted Emissions of VOC-Hazardous Air Pollutants

4.4 Water Quality

The water quality section provides a general discussion of the watershed basin and the potential impacts which would be anticipated for this project. Potential benefits are discussed qualitatively.

4.4.1 Affected Environment

The proposed main project site is located 400 feet north of Right Branch Miracle Run. Right Branch Miracle Run flows for over eight miles until it joins Miracle Run about five miles downstream from the project site. Miracle Run is one of six major tributaries of Dunkard Creek in western Monongalia County, WV. The Dunkard Creek watershed is part of the larger Lower Monongahela River watershed, identified by United States Geological Survey (USGS) Cataloging Unit Number 05020005.

The Clean Water Act requires states to produce lists of water bodies that have water quality problems limiting the designated uses of those water bodies. Dunkard Creek has been listed as a water quality impaired stream on the West Virginia 303(d) Lists for 1996 and 1998. The pollutants of concern are metals resulting from acid mine drainage. Acid mine drainage can contribute high levels of metals, such as iron and aluminum, which are detrimental to aquatic life. States are also required to develop a Total Maximum Daily Load (TMDL) for each listed water body. TMDLs analyze existing pollutant inputs from all sources and tributaries in the watershed and determine the amount of each pollutant that can be assimilated by a water body without compromising water quality standards and associated designated uses. The TMDL process is a planning tool to develop pollution reduction goals that will improve impaired waters to meet water quality standards. At this time, a TMDL has not been developed for

the Dunkard Creek watershed. Dunkard Creek is listed as a medium priority by the WV Department of Environmental Protection. Higher priority watersheds are being addressed at this time.

4.4.2 Environmental Consequences

There would be no on-site water source for this project. Water would be trucked to the site for process make-up water. The proposed project would generate a small amount of wastewater (40 gallons per day) as a result of condensation from the compressors and associated equipment to be used at the power plant site. Wastewater would be collected, pumped to a storage tank and trucked off-site for proper disposal in accordance with applicable environmental regulations.

Normal maintenance activities would be performed on the engines and generator sets. These activities would include the periodic change out of lubricants - including oil and grease. Unexpected equipment breakdown could also occur. Depending on the nature of the equipment failure, oil or grease could escape the engine casing and antifreeze could escape the radiative cooling system. The proposed project has planned for unexpected equipment breakdown that could result in the release of lubricants and antifreeze. Each of the engine/generator sets would be built on separate skids that act as catch basins for any potential spills. The volume of the skid containers would be large enough to hold all oil and anti-freeze from the engines. Also, the modular design of engine/generator sets allows for the removal of a failed unit with little impact to the operation of the proposed facility. Major overhauls of equipment would take place at a offsite location further reducing the likelihood of releasing oil, grease, or antifreeze into the watershed.

There are no wastewater facilities available at this small rural project site. Area homeowners use septic systems for disposal of domestic wastewater. Portable restroom facilities would be rented by Northwest Fuel. Additional portable facilities could be made available during construction at the project site. No permanent restroom facilities would be constructed at the project site.

Given the small amount of wastewater generated by this project and the plans to collect and properly dispose of the wastewater offsite, no impacts to water quality from wastewater discharge is expected. Additionally, with the proposed project's modular design, which includes integral spill containment structures, and the plans for major equipment overhauls to be completed at an offsite location, no releases of oil, grease or antifreeze would be expected. During construction, standard best management practices would be used to control storm water runoff and erosion at the site. Therefore, no

impacts on the water quality of Miracle Run or the Dunkard Creek watershed are anticipated.

4.5 Socioeconomic Resources

Socioeconomic resources include the general sociological and economic climate in the area of the proposed project. It includes employment considerations, such as the availability of a trained workers and demands placed on the local workforce, impacts to the tax base, and population demographics. Other factors include demands for and the availability of supporting infrastructure such as educational, recreational, and childcare services.

4.5.1 Affected Environment

Monongalia County has a population (Census 2000) of 81,866. This is an increase of 8.4 percent from the 1990 population. Over the same time period, the population of the state as a whole rose by only 0.8 percent. The County includes only five incorporated municipalities; all but one (Blacksville) are located in the central district of the County. The unemployment rate in Monongalia County (October 2001) of 1.7 percent compares favorably to the unemployment rate of 3.9 percent for the state as a whole. The median income for County residents is $32,365, approximately 18 percent higher than for the State as a whole.

Western Monongalia County is largely unincorporated. The town of Blacksville, located approximately 6.5 miles northeast of the proposed project, experienced a decline in population in the decades of the seventies and eighties. The decline stabilized somewhat in the mid-nineties, but continues with the estimated population (1999) at 157.

4.5.2 Environmental Consequences

The proposed project would have no permanent on-site workforce, and the number of workers employed during the construction phase of the project would not be significant compared to the total nonfarm employment base of over 29,300 (1999) for the County as a whole. With no permanent workforce or sizable transient workforce, the proposed project would not be expected to increase the school-aged population or have any adverse impacts to local educational or recreational resources. Some minor increase to the tax base due to construction and operation of the proposed project may occur, but would be minor when compared to the existing County tax base.

4.6 Safety and Health

Safety and Health pertains to the workforce which would be employed in the construction and operation of the proposed project. This would include any transient workforce involved in construction as well as the permanent workforce employed in the operation of the power generation facility. Personnel servicing the construction and operation phases of the proposed project - such as those making deliveries to the site, are also considered within the resource of Safety and Health.

The proposed project would also utilize coal mine waste methane, which is a flammable gas. The gas would be transported to the engine gensets through a gas pipeline which would be routed underground except for a small section where the line would pass under County Route 13 and cross over the Right Branch Miracle Run. After the aerial stream crossing, the pipeline would continue underground across the Parrish Shaft site to the power generation facility on the northwest portion of the site. As part of the scoping process, DOE identified for further analysis the possibility of accidental release of methane from the pipeline. This issue is analyzed in this section of the EA.

4.6.1 Affected Environment

Emergency services are provided throughout Monongalia by a central dispatch (MECCA 911). The western part of the County is serviced by a local volunteer fire department - the Clay Battelle VFD and by the Monongalia Sheriff's Department and the Morgantown Detachment of the West Virginia State Police. The area is served by two hospitals located in Morgantown, the county seat, approximately 30 minutes distance by road. The hospitals include a Level 1 trauma center.

The proposed project includes activities that could present potential safety and health hazards to personnel performing work at the site. It is understood that employees will not be at the site on a permanent basis. However, servicing and maintenance of the eighteen internal combustion engines and generators at the site would require periodic visits. For operational activities, US Department of Labor, Occupational Safety and Health Administration (OSHA) requirements would be in effect. These standards are published as 29 Code of Federal Regulations (CFR), Part 1910, "Occupational Safety and Health Standards". Northwest Fuel would be responsible for compliance with OSHA's 29 CFR 1910 requirements.

4.6.2 Environmental Consequences

Industrial noise may pose an impact to employees. Noise exposure is regulated by OSHA in 29 CFR 1910.95, "Occupational Noise Exposure". Noise is defined as unwanted sound. Occupational noise exposure has been demonstrated to cause short and long-term hearing loss to exposed employees. OSHA has established that employees may be exposed to no more that 90 decibels measured on an A-scale (dBA) averaged over the course of an 8-hour shift. The time weighted average exposure of 90 dBA is referred to as the "Permissible Exposure Limit". If any employee is exposed to a noise level of 85 dBA averaged over the course of an 8-hour shift, the employer is required to implement a comprehensive hearing conservation program. The time weighted average exposure of 85 dBA is referred to as the "Action Level".

An operation in Ohio similar to the Parrish Shaft site had noise measurements at one location on the facility of 103 dBA. An unprotected employee would be allowed in noise levels of this magnitude for less than an hour. Based on measurements taken during a visit at the Rose Valley site near Cadiz, OH, workplace sound level of around 98 dBA would be expected at the proposed facility on the Parrish Shaft site. A properly calibrated sound level meter would be required to evaluate actual noise levels after commencement of the project. In order to determine actual employee noise exposures, personal dosimetry with calibrated noise dosimeters would need to be performed on employees performing work in the area.

In the event of employee exposures above the time weighted Action Level of 85 dBA, Northwest Fuel would be required to institute a Hearing Conservation Program with the following elements:

Implementation of a monitoring program, including area monitoring and personal monitoring for employees.

Establishment of an audiometric testing program. This includes performing a baseline and periodic audiograms in accordance with 29 CFR 1910.95, paragraphs (g) and (h).

Making hearing protection devices readily available to employees in the program. The Industrial Partner would be required to provide training on the proper fit, use, and care of the devices in accordance with 29 CFR 1910.95, paragraphs (i) and (j).

Providing training to all employees in the program in accordance with 29 CFR 1910.95, paragraph (k). Among the topics required in this training are the effects of noise on hearing; and the purpose and proper use of hearing protection devices.

Establishment of recordkeeping as required in 29 CFR 1910.95, paragraph (m). Records are required to be kept on noise measurements, exposure assessments, and audiometric testing.

During servicing activities for the generator, internal combustion engines, or associated equipment, OSHA's electrical safety requirements may be relevant. The following sections would be in effect when dealing with live electrical equipment:

29 CFR 1910.302 - "Electrical Utilization Systems"

29 CFR 1910.303 - "General Requirements"

29 CFR 1910.333 - "Selection and Use of Work Practices"

29 CFR 1910.334 - "Use of Equipment"

29 CFR 1910.335 - "Safeguards for Personnel Protection"

OSHA requires all employers using hazardous chemicals to establish a Hazard Communication Program if hazardous materials are present on site. OSHA's definition of hazardous materials includes such items as flammable substances, toxic materials, carcinogens (cancer causing substances) corrosive materials, irritants, and oxidizers. 29 CFR 1910.1200 paragraph (d) details what factors determine if a chemical is hazardous. OSHA requires the following elements in 29 CFR 1910.1200:

A written Hazard Communication Plan which describes how the employer will comply with the various sections of the Hazard Communication Standard. Requirements for the plan are listed in 29 CFR 1910.1200, paragraph (e).

The maintenance of material safety data sheets (MSDSs) for all hazardous chemicals used or stored at the site. MSDS requirements are outlines in 29 CFR 1910.1200, paragraph (g).

Proper labeling of all hazardous chemicals at the work site. At a minimum, hazardous substance containers would be required to be labeled as to their contents, health and physical hazards posed by the contents, and the name/phone number/address of the manufacturer or distributor. Labeling requirements are detailed in 29 CFR 1910.1200, paragraph (f).

A Hazard Communication training program. Employees would be required to be trained on the identity of hazardous substances on the worksite, hazards posed by these substances, protective measures which can be used to protect employees against these hazards, methods of detecting the presence of these hazardous substances, employee rights under the Hazard Communication Standard, and details of the Industrial Partner's written Hazard Communication Plan. Training requirements are detailed in 29 CFR 1910.1200, paragraph (h).

A list be maintained of all hazardous substances present at the worksite would also be required.

Construction activities at the Parrish Shaft site may involve several OSHA standards. Construction activities are covered by 29 CFR 1926, "Safety and Health Requirements for Construction". Excavations for fuel lines feeding the project would be covered by 29 CFR 1926, Subpart P, "Excavations". OSHA has requirements for protecting occupants of open excavations and trenches, including utilizing shoring systems and sloping options.

The project plans call for erecting a 90 foot high exhaust stack. For stack erection activities, 29 CFR 1926 Subpart N, "Cranes, Derricks, Hoists, Elevators, and Conveyors", sections 550-556 covers operational requirements for cranes, material hoists, personnel hoists, and overhead hoists.

Concrete operations would be required to pour the footings for some equipment. The Industrial Partner would be required to follow 29 CFR 1926, Subpart Q, "Concrete and Masonry Construction".

General personal protective equipment requirements for construction activities, including head, foot, and eye protection, are covered in Subpart E, "Personal Protective and Life Saving Equipment".

Application of regulatory requirements under OSHA would be expected to provide adequate worker safety, and safety and health services are available in the County. The proposed project would not be expected to adversely impact the safety and health of the local workforce.

The proposed project would gather 500 MCFD of high quality (89% methane) mine gas and 650 MCFD of low quality (45% methane) through the pipelines from the ventilation boreholes to the Parrish Shaft site. Methane is a flammable gas, and mixture

of methane and air can burn if the methane concentration is between 5.3% and 15%. If the methane concentration in air is below 5.3%, the mixture is too lean to ignite or sustain combustion. If the methane concentration in air is above 15%, the mixture is too rich. The limits are respectively referred to as the lower and upper limits of flammability, or the Lower Explosive Limit (LEL) and Upper Explosive Limit (UEL).

The pipelines for the proposed project would operate under a vacuum system, and would not be pressurized. Under normal operations, the methane would not be expected to be released even if the pipeline would be breached. In the event of a failure of the project's collection blowers, which would provide the vacuum to the pipeline, gas pressure in the pipeline could stabilize to the approximate reservoir pressure (the gas pressure in the coal mine). Under this scenario and with the simultaneous failure of the pipeline, mine methane may be released to the atmosphere at the point where the pipeline was breached if the atmospheric pressure is less than the gob reservoir pressure.

NETL analyzed the risk of the release of mine methane to atmosphere using an emergency response model developed by the Federal Emergency Management Agency (FEMA, 1988). Under the very unlikely dual failure scenario (that is, the collection blower fails allowing the pipeline pressure to rise to reservoir pressure and the pipeline is breached at a point where is crosses the Right Branch Miracle Run) and the condition where reservoir pressure is higher than atmospheric pressure, methane may be released to atmosphere. NETL used a model known as ARCHIE (Automated Resource for Chemical Hazard Incident Evaluation) to evaluate the potential for buildup of explosive concentrations of methane at or near ground level.

The scenario modeled assumed a convergence of worst case conditions such as a full breach of the pipeline, stable atmospheric conditions, and a release extending for 10 hours, such as might occur overnight. The results of the evaluation indicate that a flammable mixture could occur within the immediate vicinity (~ 35 ft) of the breach, but would not extend offsite. Additionally, the total amount of methane within the area above the LEL would be approximately 11 lbs. Unconfined mixtures of flammable gas and air generally will not explode if the total amount of flammable gas in the atmosphere is less than 1000 lbs. The methane and air mixture that could result from the accidental release scenario evaluated would not be expected to be an explosion hazard to either workers onsite or to nearby residents.

4.7 Floodplains and Wetlands

4.7.1 Affected Environment

The proposed main project site (generator pad) would consist of a graded and fenced area, approximately 150 by 300 feet. It would be located slightly up slope, 400 feet north of Right Branch Miracle Run. This area has been previously disturbed by the construction of an electrical substation, mine emergency escape shaft, numerous bore holes and vents, associated access roads and parking area. A pipeline would gather waste methane from existing bore holes located in the hills south of the generator site. The pipeline would collect waste methane from the first borehole, cross a small intermittent stream adjacent to County Road 15, continue uphill to another borehole, follow the ridge line and then continue downhill to the generator site after going under County Road 13 and crossing Right Branch Miracle Run.

A site visit was completed in October, 2001. There was no outward sign of any obvious wetlands in the immediate vicinity of the project site. Right Branch Miracle Run is a very small creek easily stepped across at that time of year. A 1987 U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) map for the Wadestown, WV-PA quadrangle shows that no wetlands have been identified in the immediate project area. A small palustrine wetland with emergent aquatic vegetation (classified as PEM1C) occurs about 2,000 feet downstream from the project area. According to the National Wetlands Inventory, the classification PEM1C means the following:

P	=	palustrine (swampy)
EM	=	emergent vegetation (e.g., cattails)
1	=	persistent
C	=	seasonally flooded

This wetland is located approximately one half mile northeast of and on the other side of County Route 13 from the proposed project site.

4.7.2 Environmental Consequences

The main project area would be constructed at approximately 1,060 feet above sea level. This places the proposed project site just above the 100-year flood elevation. This determination is based on the Federal Emergency Management Agency' s Flood Insurance Rate Map (Community Panel Number 540139 0050 B; dated May 1, 1984)

covering the project area. Therefore, the main part of the proposed project would not be constructed in a floodplain.

The pipeline carrying waste methane from the borehole vents will need to cross Right Branch Miracle Run and a support structure would be required for this elevated pipeline section. The project would make all attempts to minimize the size of the concrete foundations for the elevated pipeline supports and place them above the anticipated high water mark corresponding to the 100-year flood elevation where practicable. It is anticipated that at least one small (<10 square feet) footer would be installed within the area of the 100-year floodplain.

The pipeline from the first borehole would need to cross the unnamed perennial tributary along County Road 15. This pipeline section would be trenched from the borehole, across the stream, and then up slope to the next borehole. The area where the pipeline would cross this un-named stream is just upstream from the section identified to be within the 100-year floodplain.

There are no documented wetlands in the immediate area of the proposed project site. This is based on official U.S. Fish and Wildlife Service National Wetland Inventory maps (1987) and confirmed by a site visit. A small wetland located approximately 2,000 feet downstream of the proposed project site would not be affected by the project during either construction or operation. A small (6 inches diameter) pipeline supplying waste methane to the generators would need to cross Right Branch Miracle Run. All efforts would be made to minimize any impacts to the creek. Instead of trenching across the creek, the pipeline would be elevated to cross over the creek. The project would make all attempts to minimize the size of the concrete foundations for the elevated pipeline supports and place them above the anticipated high water mark corresponding to the 100-year flood elevation. However, given the span of the crossing, it is expected that one concrete footer for the proposed support structure would be located in the floodplain on Right Branch Miracle Run.

4.8 Flora and Fauna

4.8.1 Affected Environment

The vast majority of land surrounding the proposed project site is composed of woodland and pasture. This agrees with the general dominance of woodland (60%) and pastureland (20%) in the Dunkard Creek watershed. The woodlands are typical temperate mesophytic (moderate moisture) forests, with mostly regenerated oak-hickory forests of pole to saw timber size. Existing stands in the area are composed of black oak

(*Quercus velutina*), red oak (*Quercus rubra*), chestnut oak (*Quercus prinus*), white oak (*Quercus alba*), various hickories (*Carya* spp.), sugar maple (*Acer saccharum*), and yellow poplar (*Liriodendron tulipifera*). The forests on the adjacent hillsides have been disturbed by the placement of boreholes, power lines, and access roads associated with local coal mining activities.

The Dunkard Creek watershed offers good habitat for white-tailed deer (*Odocoileus virginianus*) and wild turkey (*Meleagris gallopavo silvestris*) resulting in large populations of big game animals. Populations of small game animals, including cottontail rabbits *(Sylvilagus floridanus*), eastern gray squirrel (*Sciurus carolinensis*), and fox squirrels (*Sciurus niger*), are good, with fair numbers of ruffed grouse (*Bonasa umbellus*). The Dunkard Creek watershed is also home to a variety of raptors, passerines, waterfowl, non-game animals, reptiles and amphibians.

No Federally listed threatened or endangered species are known to occur in the Dunkard Creek watershed, and are therefore not expected to be found at the project site. Species of concern currently have no legal protection, may be in need of concentrated conservation actions, and could become candidates for future listing as more reliable data on their distribution becomes available. The area could be summer range for the Indiana bat (*Myotis sodalis*), but no sitings in Monongalia County have been documented. Dunkard Creek is home to two species of concern, the salamander mussel (*Simpsonaias ambigua*) and the snuffbox mussel (*Epioblasma triquetra*). However, these mussels are found in small to medium-sized rivers with good water quality and should not be found in the small tributary streams at the project site. The salamander mussel is only found where its host species, the common mudpuppy (*Necturus maculosus*), is located. Other species of concern found in Monongalia County that could be found around the project site include Bachman's sparrow (*Aimophila aestivalis*), Butternut (white walnut; *Juglans cinerea*), and Barbara's buttons (*Marshallia mohrii*). However, these species have not been identified in the immediate project area and/or have not been reported in over ten years. Additional species of concern have been documented from other areas of Monongalia County that offer unique habitat not found at the project site.

4.8.2 Environmental Consequences

The proposed main project site would be located in a previously disturbed area between two hillsides, 400 feet north of Right Branch Miracle Run. This area is mostly overgrown pastureland that was at one time woodland prior to disturbance by mine-related activities. The pipeline for this project would be placed to minimize disturbance to the forested woodlands by locating it along existing access roads, jeep trails, and power line rights-of-way where possible.

Since this project would be placed in a previously disturbed area, adverse impacts to fish, plant, or wildlife species from construction or operation of the proposed project would be minimal. There may be some avoidance of the immediate project area due to higher levels of human activity and associated noise. However, this should be very localized and would diminish with time as construction activities are completed and animals acclimate to the project. Furthermore, no Federally listed threatened or endangered (T&E) species are known to occur in the watershed. As part of its scoping process, DOE consulted with the U.S. Fish and Wildlife Service (USFWS). The USFWS has not identified any T&E species or critical habitat in the proposed project area. Letters of consultation and response are included in Appendix A of this EA.

4.9 Cultural and Historic Resources

The most comprehensive national policy on historic preservation was established by Congress with the passage of the National Historic Preservation Act of 1966 (NHPA). In this act historic preservation was defined to include "the protection, rehabilitation, restoration and reconstruction of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, or culture." The act led to the creation of the National Register of Historic Places, a file of cultural resources of national, regional, state, and local significance maintained by the National Park Service (NPS) of the Department of the Interior (DOI). The act also established the Advisory Council on Historic Preservation (the Council), an independent federal agency responsible for administering the protective provisions of the act.

In general, the major provisions of the NHPA which must be addressed by DOE are Sections 106 and 110. Both sections aim to ensure that historic properties are appropriately considered in planning federal initiatives and actions. Section 106 is a specific, issue-related mandate to which federal agencies must adhere. It is a reactive mechanism that is driven by a federal action. Section 106 requires that the head of any federal agency having direct or indirect jurisdiction over a proposed federal or federally assisted undertaking in any state, and the head of any federal department or independent agency having authority to license any such undertaking must ensure that the provisions of the NHPA are administered. Section 106 also mandates consultation during such federal actions. It compels federal agencies to "take into account" the effect of their projects on historical and archaeological resources and to give the Council the opportunity to comment on such effects.

Section 110, in contrast, sets out broad federal agency responsibilities with respect to historic properties. It is a proactive mechanism with emphasis on ongoing management of historic preservation sites and activities at federal facilities. Section 110(a) of the NHPA and Executive Order (E.O.) 11593 (which was substantially incorporated into the NHPA amendments of 1980) require agencies to provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the

nation. The 1980 NHPA amendments expanded the NHPA of 1966 by making federal agencies responsible for identifying, preserving, and nominating to DOI all sites, buildings, districts, and objects under their jurisdiction or control that appear to qualify for listing on the National Register of Historic Places.

The proposed action under review in this Environmental Assessment would be entirely located on property that is not within the control or jurisdiction of the DOE. Therefore, Section 110 would not apply to the proposed project. Under Section 1.06 DOE must determine whether or not the proposed action would involve historic properties as defined by the National Park Service guidelines and seek the consensus of the SHPO regarding those historic properties and potential impacts thereto.

4.9.1 Affected Environment

Monongalia County was one of the first three counties formed within the State. It was created in October of 1776 by and act of the Virginia General Assembly from parts of the District of West Augusta. It was named for the Monongahela River which flows through the central district of the county. The Monongahela River was named by the Algonquin (Delaware) Indians from a word meaning "crumbling banks" or "high banks fall down". The spelling was changed to Monongalia - either on purpose of as a result on a error - in the bill creating the County.

The original territory which comprised Monongalia County included land now occupied by eighteen of West Virginia's fifty-five counties and parts of three counties (Greene, Fayette, and Washington) in present day Pennsylvania. The land in the three counties in Pennsylvania was lost to Pennsylvania following the westward extension of the Mason-Dixon line in 1781.

The proposed project would be located on property previously used for a mine exhaust fan. The fan was removed by the mine approximately 2 years ago, and the property is currently used for an emergency hoistway for the mine. There are no structures located on the site which would be affected by the proposed project, and the current Register of Historic Places does not have any listing for the proposed project site. The pipelines which would carry waste methane from mine vents located on private property to the southeast of the Parrish Shaft site would generally follow an existing jeep trail and power line right-of-way. As part of the site inspection, DOE walked the length of the proposed pipeline route. No structures were noted on the proposed route.

4.9.2 Environment Consequences

The proposed power generating facility would be located on property which has been previously disturbed and is currently used for mining support activities. The property was previously used for a mine exhaust fan. The fan was removed by the mine

approximately 2 years ago, and the property is currently used for an emergency hoistway for the mine. DOE reviewed the current Register of Historic Places and could identify no properties within or near the proposed project site that are listed or would be eligible for listing on the National Register. The proposed pipeline route crosses open pastureland before following an existing power line right-of-way and a jeep access trail. Other than the mine vents, power line poles and modern fencelines, no structures were identified along the proposed route.

The proposed project is not expected to involve any known or suspected historic properties of districts. Moreover, the proposed project - including the proposed pipeline route - is located on property that has been previously disturbed or is currently being used in a manner similar with actions being considered in the proposed project. Therefore, impacts to cultural and historic properties are not expected to result from the proposed action. As part of its scoping process and to comply with Section 1.06 requirements, DOE consulted with the West Virginia SHPO. The SHPO has not identified any items of historic significance associated with the proposed project. The letter of consultation and the SHPO's response are included in Appendix A.

4.10 Soils and Geology

4.10.1 Affected Environment

Soils in the area of the proposed project are stable and would be used as a base to support the light industrial structures (e.g., the 90 foot stack) which would be constructed. The soil at the Parrish Shaft site was previously disturbed. The soils along the proposed route for the gathering lines support the presence of grass and pasture lands as well provide structural support for the unimproved jeep trail and power line right-of-way. The subsurface geology of the area consists of coal sequences of sedimentary strata. The area has been extensively mined, and underground mining continues in surrounding areas. Longwall mining, such as that occurring in the general area, results in the planned collapse of undermined strata behind the active face. This collapse can produce surface subsidence, and some surface subsidence has been reported in the general area.

4.10.2 Environmental Consequences

The soils at the Parrish Shaft site would provide a base for the light industrial use. The soils have been previously disturbed, and the proposed project would not alter the current use. Installation of the gathering lines would result in a temporary disturbance to surface soils. Impacts expected would include soil erosion and runoff. Standard construction practices - including control of soil runoff and re-seeding of disturbed areas - would occur. No lasting impacts would be expected to occur to the soils and local geology as a result of the proposed action.

4.11 Noise

This Section of the EA addresses potential consequences of environmental noise.

Simply defined, noise is unwanted sound. People are exposed to noise on a nearly continual basis in every area of their lives. Excessive noise in the work place is recognized as a potential hazard for employees. Work place noise is regulated by OSHA under rules promulgated under the Occupational Safety and Health Act. Potential impacts to worker Safety and Health from work place noise from the proposed project are discussed in Section 4.6 of this EA.

In 1972, the United States Congress passed the Noise Control Act (42 USC 4901 *et seq*). In its statement of intent in passing the Act, Congress noted that " *inadequately controlled noise presents a growing danger to the health and welfare of the Nation's population, particularly in urban areas*". Congress also noted that "*the major sources of noise include transportation vehicles and equipment, machinery, appliances, and other products in commerce*". While recognizing that the primary responsibility for regulating and controlling noise rested with state and local governments, Congress declared as national policy "*to promote an environment for all Americans free from noise that jeopardizes their health or welfare*". Environmental noise is explicitly defined in Section 4902 of the Noise Control Act to mean " *the intensity, duration, and the character of sounds from all sources*". The term environmental noise is used somewhat synonymously with the term "community noise". The latter term, while not defined statutorily in the Noise Control Act, generally refers to noise to which a particular population may be exposed in the community outside of the work place.

Primary sources of community noise include those defined in general terms in the Noise Control Act (transportation vehicles and equipment, machinery, appliances, and products used in commerce). Specific examples of sources of noise (unwanted sound) within a community can include everything from traffic at a nearby airport or rail yard to barking dogs. Common sources of community noise include motor vehicles, domestic outdoor equipment (for example, lawn mowers), live or recorded music, sporting events, and industrial equipment.

To understand the potential impacts of community noise, it is helpful to understand the nature of sound, its measurements, and its propagation, or the manner in which it travels in the environment. Formally defined, sound is the fluctuations in pressure above or below the ambient pressure in a medium (such as air) that has both elasticity and viscosity (Ostergaard, 2000). When speaking of sound or noise, most people are referring to airborne sound occurring within the normal response range of the human auditory system. Airborne sound is the rapid oscillation of air pressure above or below atmospheric pressure. It is a form of mechanical energy sometimes referred to as acoustical energy. Acoustical energy is transmitted in air as a longitudinal wave (that is,

it consists of alternating zones of compression and expansion (or rarefaction) in the direction of transmission). Sound can be described in terms of frequency, or how fast these fluctuations occur, intensity , or how large these fluctuations are, and duration, or how long the sound persists. Each of these properties will be discussed below in terms of how it describes sound and how it is measured.

Because sound is the fluctuation in pressure above or below atmospheric pressure, it can be described in terms of the number of times per second that the fluctuating pressure rises above or falls below atmospheric pressure. Recalling that sound travels as a longitudinal wave, one cycle of that wave consists of a rise over atmospheric pressure (compression) followed by a drop below atmospheric pressure (expansion) and a return to the atmospheric pressure. The number of cycles per second (cps) describes the frequency of a sound. Frequency is generally described in a unit called hertz (abbreviated Hz), where one hertz is defined as one cycle per second. In the normal environment, sound is composed of various frequencies just as white light is composed of different colors. In understanding community noise, the frequencies of greatest interest are those frequencies which can be perceived as sound by the human auditory system. In a young person having a normal hearing range, the human ear can detect sounds having frequencies between 20 and 20,000 Hz. Normal human speech ranges between 100 and 6,000 Hz.

Sound intensity or amplitude refers to the relative power level of a sound. For sound within the hearing range, sound intensity corresponds to the perceived "loudness" of a sound or noise. The sound levels we encounter in daily life vary over a wide range. The lowest pressure level the human ear can detect is more than a million times less than that produced by a jet taking off. To avoid using both very large and very small numbers to express sound intensity in absolute terms, sound level is expressed in a logarithmic scale, which uses the exponential power of a number instead of the actual number. Recalling that sound is fluctuation in pressure above or below atmospheric pressure, sound intensity (or loudness) is defined as the difference in pressure fluctuation relative to a reference pressure. The unit of measure of sound level is the decibel (dB), which is a dimensionless quantity defined by:

$L = 20 \log (A/B)$ dB, where L is the sound level (in dB), and A, B are sound pressure levels.

In acoustics, all sound levels are defined as the logarithm of the ratio of two quantities where the denominator is the reference level. The sound pressure most commonly used as a reference pressure is 20 micropascals (20 μPa). This pressure was chosen as a standard reference pressure because it approximately equals the threshold of human hearing at a frequency of 1,000 Hz in a person having a normal auditory response (Ostergaard, *ob cit*).

Using this reference pressure, the lowest sound level which the human ear can detect would be expressed in decibels as 0 dB, while the sound level produced by a

nearby riveter (producing absolute pressure fluctuations of ~ 20,000,000 μPa) would be expressed as 120 dB. For most people, sound levels of 140 dB and higher would produce an actual sensation of pain. Because sound levels are expressed on a logarithmic scale, simply adding or multiplying sound levels does not give the intended results. For people having a normal hearing response, an increase in sound level of 10 decibels would be perceived as a doubling in loudness. Therefore, increasing a sound level from 65 dB to 75 dB would be perceived as doubling the loudness (an increase of 100%) rather than increasing the loudness by ~15% as would be indicated if the scale was linear. An increase in sound level of 3 dBA would be barely noticeable while an increase of 5 dBA would be clearly apparent for most people in normal circumstances (Cavanaugh,1998).

The duration of a sound is the time over which the pressure fluctuations occur. Sounds may be constant with respect to intensity and frequency, or they may vary in intensity, frequency or both. Sounds may also be impulsive - such as the sound produced by a pneumatic hammer or pile driver. In general, impulsive sounds are more readily perceived than are steady-state sounds of similar frequency and amplitude.

Because community noise is most concerned with sound that is detected by the human ear, a weighting factor is often used to measure environmental sound. Referred to as "A-weighted sound", this weighting factor places greater emphasis on those frequencies that are detected by people having a normal auditory response. The A-weighted sound level de-emphasizes the very low and very high frequency components of sound in a manner similar to the frequency response of the human ear. A-weighted sound levels, which are expressed in decibels and indicated as dBA, correlate well with subjective reactions to noise.

In addition to weighting community noise to better reflect the human response to noise, it is also necessary to express sound that varies over time in frequency and loudness. A metric commonly used is the equivalent continuous sound level, expressed as L_{EQ}. The equivalent continuous sound level is the steady-state sound level that would produce an equivalent amount of acoustical energy as that present in the fluctuating sounds over the period of measurement (often 24 hours). L_{EQ} can be thought of as the average energy level of a varying sound in a community. Noise regulations often use L_{EQ} as an enforceable standard, and while L_{EQ} is not a direct measure of how people perceive and react to noise, L_{EQ} does correlate well with community responses to intrusive noise.

While L_{EQ} does correlate well with community response to noise, it does not adequately address the annoyance that the sound represents to the community - particularly in the nighttime when intrusive noise is generally perceived as being more annoying. A metric commonly used to express community noise and one that accounts for the difference between daytime noise and nighttime noise is the day-night equivalent noise level, expressed as DNL or L_{dn}. DNL is an equivalent noise index that accounts for the greater annoyance caused by noise during the nighttime hours. DNL values are calculated by averaging hourly equivalent sound levels over a 24-hours period, and

applying a 10 dB "penalty" to noise produced between the hours of 10 pm and 7 am. The two periods (that is, 7 am to 10 pm and 10 pm to 7 am) are then averaged to compute the overall DNL. For a continuous, non-varying noise source, the 10 dB penalty for nighttime hours results in a 6.4 dB addition to the steady-state noise level when the DNL is computed. In other words, a 60 dBA continuous noise source would yield a DNL of 66.4 dBA. DNL is computed by the following equation:

$$DNL = 10 \log \tfrac{1}{24} [15(10^{Ld/10}) + 9(10^{(Ln+10)/10})] \text{ dB, where,}$$

Ld is the equivalent noise level for the daytime hours (7 am -10 pm), and,
Ln is the equivalent noise level for the nighttime hours (10 pm - 7 am).

Although the Noise Control Act established as policy the promotion of environments free from harmful noise, there are no Federal regulations governing community noise. Likewise, the Federal government has not established enforceable standards as to the acceptable levels for community noise. Responding to the mandates of the Noise Control Act, in 1974 EPA issued guidelines to assist state and local governments seeking to establish state or local ordinance, regulations, or statutes related to community noise (EPA, 1974). The recommended level for the protection against outdoor activity interference and annoyance in rural residential areas is a DNL of 55 dBA. Because of the 10 dB penalty for nighttime hours, a DNL of 55 dBA is equivalent to a continuous noise level of 48.6 dBA. EPA has also found that people in a community will notice and complain about a new noise source if that new source increases the community noise level by 5 dBA or higher over the levels of existing noise in the community without the new source.

4.11.1 Affected Environment

Neither West Virginia nor Monongalia County have implemented noise control ordinances. A mine exhaust fan was previously located at the site of the proposed project. The fan, which ran continuously, was removed approximately 2 years ago. The property line of the proposed site is located approximately 30 meters from the nearest residence, a single family dwelling immediately northeast of the site. The actual generating facility would be located near the center of the proposed site at a distance of approximately 330 meters from the nearest residence.

As part of its public scoping process, DOE met with the nearest residents to the site of the proposed project. According to these residents, the exhaust fan was installed by the mine some time after they had purchased the property adjacent to the Parrish Shaft site. Noise from the fan was an annoyance about which the residents complained to the mine on numerous occasions without satisfactory resolution. Because the fan is no longer in place, it is not possible to define precisely the noise levels experienced by the nearby residents. However, another fan located at the Honey Run mine portal a few

miles north of the Parrish Shaft site produces sound levels of approximately 65 dBA at a straight-line distance of 100 meters. This would be equivalent to a DNL of 71.4 dBA.

Because of the past experiences of the nearby residents with the exhaust fan noise, and because preliminary noise estimates derived from published data and calculated from a similar project located in Ohio suggest that noise levels could approach those produced by the exhaust fan, DOE conducted a property line noise survey to establish a baseline against which to assess potential impacts of noise from the proposed project. The survey was conducted over a 2-day period beginning at ~ 3:20 PM on Sunday, December 9, 2001 and ending at approximately 12 noon on Tuesday, December 11. The survey was conducted using a Quest 1900 digital integrating sound level meter housed in an environmental enclosure. The unit was set up on the property line between the Parrish Shaft site and the closest residence. The instrument was placed in a line-of-site with the proposed location of the generator sets. The sound meter was set to measure A-weighted sound integrated at 10 minute intervals and recorded hourly. The meter was calibrated against a Quest QC-10 acoustic calibrator at the beginning and end of the survey.

The results of the baseline survey confirm the reports of the residents as well as spot readings taken earlier in the month. The site is a quiet, rural community with little intrusive noise. The DNL for the period of the survey was 48.5 dBA. Over the survey period, peak noise level recorded was 102.1 dB. The noise level that was exceeded 50 percent of the time was 33.7 dBA. The summary information from the baseline survey is shown in Table 4.5.

Run Time:	44:39:22	LDN:	48.5dB
LEQ:	45.0dB	CNEL:	48.9dB
TWA:	52.5dB	TAKM3:	51.7dB
SEL(3):	97.1dB	Pa2Sec:	2.0
Ovl:	0.00%	LN5:	49.5dB
Peak:	102.1dB	LN10:	44.5dB
Max:	87.9dB	LN50:	33.7dB
Min:	28.2dB	LN90:	30.2dB

Logging Parameters

Start Time:	12/9/01 3:22:05 PM
Stop Time:	12/11/01 12:01:27 PM
Logging Interval:	0:10:00
Meter Range:	30 - 90dB
Weighting:	A
Peak Weighting:	C
Threshold:	Off
Exchange Rate:	3dB
Time Constant:	Fast
C-A or TAKM:	TAKM3
Filter:	(none)

Table 4.5 Parrish Shaft Site Baseline Noise Survey Summary

4.11.2 Environmental Consequences

Using the EPA guidelines, a DNL of 55 dBA would need to be met at the property line next to the closest residence to ensure that noise from the proposed project does not adversely affect community noise. The proposed project would run constantly, and would be expected to produce continuous noise. Because of this continuous operation, and the 10 dB penalty applied to noise emitted during the nighttime hours of 10 pm to 7 am, the noise level at the property line would need to be no greater than 48.6 dBA to have no significant impact to community noise using the EPA recommended DNL of 55 dBA.

The proposed project would consist of eighteen Chevrolet 454 engines powered by methane. These exhaust from these engines would be discharged through a ninety foot tall stack that would be located on the southwest side of the generator facility. The

use of reciprocating internal combustion engines fired on natural gas to produce electricity is not a new technology, and the noise produced by reciprocating internal combustion engines fired on natural gas has been studied and documented by the American Gas Association (AGA) in a 1969 report (Miller, 1969). Reciprocating Internal combustion engines produce noise primarily through three mechanisms: the engine casing, the engine exhaust, and the air intake to the engine. Based on a study on 75 reciprocating internal combustion engines - including both diesel-fuel fired and natural gas fired engines - the AGA study correlates engine casing noise to the continuous horsepower rating of the engine, the type of fuel, and the shaft speed.

The engines which would be used in the proposed project have a continuous horsepower rating of approximately 85 hp each fired on waste methane. The engines would turn at 1,800 rpm. Based on these operating parameters, casing noise from each engine would be expected to be 94.9 dBA at the source (that is, immediately next to the engine). Since noise is expressed on a logarithmic scale, adding similar noise sources is not a simple addition. For two sources having identical noise levels, the combination of these two sources is equivalent to adding 3 dB to the noise level of either source. For example, combining two 90 dB sources yields a noise level of 93 dB and not 180 dB. Applying the correction factors for the individual noise levels for casing noise to all eighteen engines, the expected casing noise would be expected to be 107.4 dBA at the source. Exhaust noise from the engines would be routed through a common stack, and would be expected to be 84.7 dBA for each engine, or 97.2 dBA for all eighteen engines. Air intake noise would be expected to be 91.5 dBA for each engine, or 106.6 dBA for all eighteen engines. Combining these three noise levels, the expected noise level at the site would be 110.4 dBA for all eighteen engines.

The AGA study was conducted prior to passage of the Noise Control Act of 1972. Thus, engines included in the study would not have been subject to regulations promulgated subsequent to the Act which impose limits on manufacturers who produce equipment used in construction (40 CFR 204) and transportation (40 CFR 205). The engines which would be used for the proposed project are conventional light truck engines, and would be subject to rule applicable to transportation equipment. DOE therefore believes the noise estimated for the proposed project using the AGA study is higher than would be expected for the proposed project.

Additionally, the noise calculated using data from the AGA report is higher than the actual noise measured at a similar site at Rose Valley near Cadiz, OH, where noise levels of 60.8 dBA were measured at a point 50 meters from the source. Correcting for attenuation from divergence, DOE has estimated noise levels of 92 dBA for the 4 gensets (plus one engine driving the blower for the stack) operating on the day of the visit to the Ohio site. Correcting to the larger number of gensets proposed for the Parrish site, noise levels at the source would be expected to be 98 dBA. Noise levels from the Rose Valley site are based on actual engines and generators similar to what would be used at the proposed site. Site layout and operation is also similar to that proposed for the Parrish

Shaft site. It is therefore DOE and the Industrial Participant's expectation that noise levels at the source (that is, without factoring in natural attenuation as described above) would be closer to the 98 dB calculated for the Rose Valley site. If this is the case, total attenuation of 49.4 dBA would be needed to ensure that the project would have no significant impact to community noise. If noise levels are closer to those estimated from the noise emission factors published by AGA, the proposed project would need to achieve noise total noise attenuation of 61.8 dBA to have no significant impact to community noise.

Environmental noise is attenuated by a number of factors, including geometric divergence, air absorption, environmental factors, and natural and constructed barriers (Driscoll, 2000). Geometric divergence (sometimes referred to as spreading loss), results as sound waves propagate away from a source. As sound waves expand they become less intense due to the larger spherical area that exists at greater distances from the source. In general, for every doubling of distance between points, where one point is a reference point, the sound level is reduced 6 dB. For example, a sound that measures 60 dbA at a point 100 feet from the source will measure 54 dBA at a point 200 feet from the source. The actual equation for calculating attenuation due to geometric divergence is:

$A_{div} = 20 \log (r/r_0)$ dB,
where r is the distance in meters from the source and r_0 is the reference distance, generally taken as 1 meter.

Attenuation due to geometric divergence is not dependent on the frequency of the sound. The distance from the property line of the Parrish Shaft site is approximately 275 meters from the proposed location of the generators. At this distance, attenuation due to geometric divergence would be expected to be 48.8 dB.

Noise is also attenuated by air absorption through the mechanisms of heat conduction and relaxation of air molecules as they vibrate. Attenuation due to air absorption is dependent of frequency, air temperature, and relative humidity. The greatest attenuation occurs in higher frequencies. The equation for calculating attenuation due to air absorption is:

$A_{air} = \alpha' r/1000$,
where α' is the air attenuation coefficient in dB/km, and r is the distance in meters from the source.

For summer conditions (86°F and 70% relative humidity), when community residents spend more time outdoors or would be more likely to sleep with their windows open, the air attenuation coefficients are 0.26, 0.96, 3.1, 7.4, 13, and 23 dB per kilometer for frequencies of 125, 250, 500, 1000, 2000, and 4000 Hz, respectively. Expected attenuation due to air absorption for the proposed project would be expected to range

from less than 0.1 to 6.3 dB, with the greatest attenuation occurring in the higher frequencies.

Attenuation also occurs due to environmental factors, which include wind and temperature gradients and ground absorption and reflection. Environmental factors such as wind and temperature gradients can vary greatly and ground absorption is also affected by weather because snow-covered ground absorbs lower frequency sounds more readily than grass-covered ground. The Parrish shaft site is characterized by mixed ground types. The property inside the fenceline includes open water (a drainage pond associated with mine-related activities not related to the proposed project), graveled roads and packed earth. All of these ground types would be classified as "hard ground" (providing minimal sound absorption) for purposes of calculating environmental attenuation. The area between the fenceline and the property line (approximately 60 m) consists of grass-covered ground, which would be classified as soft ground for purposes of calculating sound absorption. Environmental attenuation (A_{ENV}) is frequency dependent. Total attenuation due to environmental factors would be expected to range from around -1.5 dB for lower frequency components to around 14 dB for higher frequency components.

Other factors contributing to attenuation include natural barriers (such as hills and trees) and manmade barriers such as berms. Trees and vegetation offer an effective visible barrier, but are acoustically transparent, and are not an effective barrier to noise. The generation facility would be situated further up in the small valley present at the site, and the intervening hill would be expected to provide some barrier to sound originating from the gensets proper. The exhaust stack would be located closer to the current road, and would be in visible light of site to the nearest residence. The natural topography of the site would not be expected to pose any acoustical barrier to noise emitted from the stack tip.

Considering all factors expected to attenuate noise from the proposed project, total attenuation in excess of 55 dB would be expected at the property line. This attenuation would be adequate to reduce the lower expected noise level to below levels of concern. If noise is turns out to be closer to that predicted by noise emission factors, additional noise attenuation would be needed to ensure that noise from the proposed project does not significantly impact community noise.

Propagation of noise in the environment is a complex process, and actual noise levels cannot be precisely predicted. The Industrial Participant has submitted and DOE has reviewed a plan for additional noise reduction at the site should noise exceed expected levels. Proven measures being considered include a stack silencer, which would reduce the noise emitted from the stack tip by up to 75 dB . The stack is expected to emit lower frequencies than the gensets proper. Lower frequencies attenuate less readily than do higher frequencies. Also, the stack tip would of necessity be an elevated source and in the line-of-site to the closest residence. Both the presence of lower frequencies and the elevation of the source would favor the propagation of noise from the

stack. Reducing stack noise would therefore appear to offer the greatest opportunity to reduce noise from the proposed project. Additional measures under consideration include construction of sound barriers curtains in the vicinity of the gensets. This measure would be expected to reduce noise levels from the two banks of gensets by an additional 15 dB. It is unlikely that these latter measures will be necessary. However, DOE would conduct follow-up noise surveys once operations commence to ensure that the project does not increase the total community noise to a level greater than 3 dbA above the measured baseline and that fenceline noise attributable to the proposed project does not exceed 55 dBA for greater than fifteen (15) minutes in a twenty-four (24) hour period.

4.12 Environmental Justice

Environmental justice addresses considerations related to the fair treatment and meaningful involvement of all people regardless of race, ethnicity, culture, income, or educational level in developing, implementing, and enforcing environmental laws, regulations, and policies. The environmental justice movement was started by citizens, primarily persons of color, who needed to address the inequity of environmental protection services in their communities. The goal of environmental justice is to ensure that all people, regardless of race, national origin or income, are protected from disproportionate impacts of environmental hazards.

On February 11, 1994, President Bill Clinton signed an Executive Order (EO 12898) to focus federal attention on the environmental and human health conditions of minority and low-income populations with the goal of achieving environmental protection for all communities. The Order directed Federal agencies to develop environmental justice strategies to aid Federal agencies in identifying and addressing disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The Order is also intended to promote nondiscrimination in Federal programs substantially affecting human health and the environment, and to provide minority and low-income communities access to public information on, and an opportunity for public participation in, matters relating to human health or the environment.

To be classified as an environmental justice community, residents must be a minority and/or low income group; excluded from the environmental policy setting and/or decision-making process; subject to a disproportionate impact from one or more environmental hazards; and experience a disparate implementation of environmental regulations, requirements, practices and activities in their communities. To determine whether the potential exists for environmental justice issues to result from a proposed Federal action it is first necessary to determine whether the site where the proposed Federal action will occur would be classified as environmental justice community. The

most reliable source of such data is the census tract data collected and reported by the Census Bureau.

Census tracts are small, relatively permanent geographic entities within counties delineated by a committee of local users of statistical data collected by the Census Bureau. The Census Bureau uses census tracts to collect, organize, tabulate, and report the results of its decennial (occurring every 10 years) censuses. Generally, census tracts have between 2,500 and 8,000 people and boundaries that follow visible features such as roads, highways, rivers, railroads, or high-tension power lines. In other words, the boundaries of census tracts can be clearly demarcated with regard to the population included in a particular census tract. The Census Bureau recognizes 50,690 census tracts in the United States and Puerto Rico.

4.12.1 Affected Environment

The proposed project would be located in Western Monongalia County West Virginia. The proposed site falls in Census Tract 114 within Monongalia County West Virginia (hereafter referred to herein as simply tract 114). Tract 114 is roughly demarcated by the Marion County- Monongalia County border on the south, the Wetzel County-Monongalia County border on the west, and the Pennsylvania border on the north. The eastern boundary of Census Tract 114 roughly follows County Route 29 to Route 33 to Route 22 to Route 31 where it joins State Route 7. The northeastern border runs west along State Route 7 before terminating at the Pennsylvania border just east of Blacksville, WV.

Data from the 2000 decennial census is still being tabulated at the local level. Based on the 1990 census, Census Tract 114 had a total population of 3,909 persons. Of this total population, 3,901 persons identified their race as "White"; 8 persons identified their race as Asian or Pacific Islander. No responders to the census identified their race as Black or identified themselves as being of Hispanic origin. By comparison, taken as a whole, Monongalia County has a Black population of 3.4 percent and an Asian or Pacific Islander population of 2.5 percent. One percent of County residents identify their national origin as being Hispanic. Based on these data, Census Tract 114 would not be classified as an environmental justice community with regard to race or national origin.

The median household income in Census Tract 114 (based on 1989 data) is $25,107. The median household income for Monongalia County (based on 1993 data) was $28,537. Adjusting these figures using an annual 3 percent cost-of-living adjustment between 1989 and 1993 would indicate an adjusted 1993 median income for Census Tract 114 of $28,258. Both Monongalia County as a whole and Census Tract 114 taken individually have median incomes that are greater than the median income than the State taken as a whole. Additionally, the median income for Census Tract 114 is greater than the median income for all but four of the nineteen census tracts in Monongalia County.

Based on these data, Census Tract 114 would not be classified as an environmental justice community with regard to income level.

4.12.2 Environmental Consequences

The population potentially affected by the proposed project would not be classified as an environmental justice community. Further, the expected impacts from the proposed Federal action would not include actions having an adverse impact on the environment or representing a disparate application of environmental laws or policies.

4.13 Aesthetics

4.13.1 Affected Environment

The proposed project would be located in a rural setting in a valley with a history of farming and underground mining. Currently, a small transformer and associated power lines and an emergency mine hoist and associated structures are located on the proposed site. The topography of the area varies from a flat stream valley to steep hills and small ridge lines. Elevations of nearby hilltops exceed 1600 feet above sea-level, and the topographic relief (the difference between the lowest and highest elevations) in the vicinity of the proposed project is over 400 feet. Vegetative cover on the valley and slopes includes hardwoods and evergreens reaching heights of 70 feet and more.

4.13.2 Environmental Consequences

The exhaust stack for the proposed project would be 90 feet in height. The stack would be located at the edge of the main valley and would be visible to some nearby residences to the north and south of the project site. The height and location of the stack are based on screening modeling studies performed in conjunction with the application to the WVDEP- DAQ for the permit to construct the proposed facility. Moving the stack further up the side valley would have resulted in ground level impacts on the hilltop and slope from the project exhaust. This, in turn,. would have required increasing the elevation of the stack to avoid these impacts.

Although the stack for the proposed project would be taller than any man-made structures in the vicinity, it would have little impact on the viewshed. The view of the stack from the residences to the south would be partially obstructed by trees and topography and naturally mitigated by the distance to the site (approximately ½ mile). The view of the stack from residences north of the site would be partially obstructed by trees and topography. Further the tree-covered slope to the southwest of the site would provide a visual backdrop with staggered vertical components (trees) which should largely mask the view of the stack from all but the closest residence. The view of the stack from the closest residence would be partially obstructed by the intervening

topography and by other man-made object such as the pre-existing transformer station and the utility poles and wires.

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